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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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BLAKE A. WELCHER
DIGITAL THEATER SYSTEMS, INC.
5171 CLARETON DRIVE
AGOURA HILLS, CA 91301

EXAMINER	
CHAWAN, VIJAY B	
ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 09/10/2004 12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/680,737	SMITH ET AL.
	Examiner	Art Unit
	Vijay B. Chawan	2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 15-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 15-19* is/are rejected.

7)☒ Claim(s) *10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fosgate et al., (WO 02/19768) in view of Griesinger (5,796,844).

As per claim 1, Fosgate et al., teach a method of decoding two-channel matrix encoded audio to reconstruct multichannel audio that approximates a discrete surround-sound presentation, comprising:

subband filtering the two-channel matrix encoded audio into a plurality of two-channel subband audio signals (page 36, lines 28-30; page 37, line 1);

steering the two-channel subband audio signal in a sound field to form multichannel subband audio signals (page 37, lines 6-7; Fig. 16A, item 124); and,

synthesizing the multichannel subband audio signals in the subbands to reconstruct the multichannel audio (page 38, lines 12-16).

Fosgate et al., however, do not specifically teach separately steering the two-channel audio signal. Griesinger does teach separately steering the two-channel subband audio signal in a sound field to form multichannel subband audio signals (Col.13, line 66 – Col.14, line 25). Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, that by separately steering the audio signal as taught by Griesinger incorporated in the method of Fosgate et al., to design a decoding matrix by providing high left to right separation in all output channels, and this high separation is maintained regardless of the direction of the dominant encoded signal.

4. Claims 2-4, 6,and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fosgate et al., (WO 02/19768) in view of Griesinger (5,796,844), and further in view of Dressler ("Dolby Pro Logic Surround Decoder Principles of Operation", Dolby Laboratories, August 29, 2000).

As per claim 2, Fosgate et al., in view of Griesinger, teach the method of claim 1, but do not specifically teach wherein the reconstructed multichannel audio comprises a plurality of dominant audio signals. The aforementioned feature is well known in the art as taught by Dressler. Dressler teaches sensing when a dominant sound occurs and a decoder then provides enhancement on an instantaneous basis between two or more encoded positions when the signal peaks are prominent enough to be heard as individual events (page 7, lines 48-51, 61-64). Therefore it would have been obvious to one with ordinary skill in the art at the time of invention to modify the method of decoding two-channel matrix encoded audio of Fosgate et al., in view of Griesinger with the teachings of Dressler, wherein the reconstructed multichannel audio comprises a plurality of dominant audio signals for the purpose of enhancing the audio signals to provide a signal which is more realistic and high in quality.

As per claim 3, Fosgate et al., in view of Griesinger as modified by Dressler teaches the method of claim 2. However, Fosgate et al., in view of Griesinger do not specifically teach decoding two-channel matrix encoded audio wherein said dominant audio signals reside in different subbands. The aforementioned feature is well known in the art as taught by Dressler. Dressler teaches providing enhancement between two or more encoded positions when the signal peaks are prominent enough to be heard as individual events (page 7, lines 48-51). The two or more encoded positions may be in different subbands. Therefore it would have

been obvious to one with ordinary skill in the art at the time of invention to modify the method of Fosgate et al., in view of Griesinger, with the teachings of Dressler, because, decoding two-channel matrix encoded audio wherein said dominant audio signals reside in different subbands to enhance certain parts of the audio signal.

As per claim 4, Fosgate et al., in view of Griesinger as modified by Dressler teaches the method of claim 3. However, Fosgate et al., in view of Griesinger do not specifically teach decoding two-channel matrix encoded audio wherein steering the two-channel subband audio comprises computing a dominance vector in said sound field for each said subband, said dominance vector being determined by the dominant audio signals in the subband. The aforementioned feature is well known in the art as taught by Dressler. Dressler teaches resolving the magnitudes of the signals along each axis and converting them from rectangular to polar coordinates to show dominance as a vector quantity (page 8, lines 38-42). Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention modify the method of Fosgate et al., in view of Griesinger, with the teaching of Dressler, wherein the steering the two-channel subband audio signals comprises computing a dominance vector in said sound field for each said subband so that both the angle and the magnitude of the signal are taken into account when enhancing the audio signal.

As per claim 6, Fosgate et al., in view of Griesinger as modified by Dressler teaches the method of claim 1. However, Fosgate et al., in view of Griesinger do

not specifically teach the method of claim 1, wherein the two-channel matrix encoded audio includes at least left, right, center, left surround and right surround (L,R,C,Ls,Rs) audio channels, said two-channel subband audio signals being steered into an expanded sound field that includes a discrete point for each said audio channel. The aforementioned feature is well known in the art as taught by Dressler. Dressler teaches a decoder that recovers the left, center, right signals for playback over three front speakers, and extracts the surround signal for distribution over an array of speakers wrapped around the sides and back of the theatre (page2, lines 8-10, page 8, lines 47-48, Figs. 3,4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the method of decoding two-channel matrix encoded audio to reconstruct the multichannel audio to reconstruct multichannel audio of Fosgate et al., in view of Griesinger wherein the two-channel matrix audio includes at least left, right, center, left surround and right surround (L,R,C,Ls,Rs) audio channels, said two-channel subband audio signals being steered into an expanded sound field that includes a discrete point for each said audio channel because, this would effectively create a surround-sound environment.

As per claim 11, Fosgate et al., in view of Griesinger teach the method of claim 1. Fosgate et al., in view of Griesinger do not specifically teach wherein the expanded sound field comprising a 9-point sound field, each said discrete point corresponding to a set of gain values predetermined to produce an optimized audio

output at each of L, C, R, Ls, and Rs speakers, respectively when the two-channel subband audio signals are steered to that point in the expanded sound field. Dressler teaches a decoder that recovers the left, center, right signals for playback over three front speakers, and extracts the surround signal for distribution over an array speakers wrapped around the sides and back of the theatre (page 2, lines 8-10, Figs. 3 and 4). The number of speakers in the array may be nine in order to create a 9-point sound field. Dressler further teaches monitoring the encoded soundtrack to evaluate the inherent soundfield dominance, and applying enhancement in the same direction and in proportion to that dominance (page 8, lines 53-57). The gain values are used in computing soundfield dominance.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention to modify the method of decoding two-channel matrix encoded audio to reconstruct multichannel audio of Fosgate et al., in view of Griesinger, wherein the expanded soundfield comprising a 9-point sound field, each said discrete point corresponding to a set of gain values predetermined to produce an optimized audio output at each of L, R, C, Ls, Rs speakers, respectively, when the two-channel subband audio signals are steered to that point in the expanded sound field as taught by Dressler, for the purpose of enhancing the surround-sound effect.

5. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fosgate et al., (WO 02/19768) in view of Griesinger (5,796,844) as applied to claim 1, and in view of Davis et al., (5,247,740).

As per claim 5, Fosgate et al., in view of Griesinger teaches the method according to claim 1. However, Fosgate et al., in view of Griesinger do not specifically teach wherein the subband filtering groups the subband audio signals into a plurality of bark bands. Davis et al., teach subband coding to reduce the amount of information transmitted in a particular frequency band where the resulting coding noise is psychoacoustically masked by neighboring spectral components. Psychoacoustic masking effects usually may be more efficiently exploited if the bandwidth of the frequency band is chosen commensurate with the bandwidths of the human ear's "critical bands" (Col.4, lines 1-8). Bark bands are a type of critical band. Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate subband filtering of the subband audio signals into a plurality of bark bands as taught by Davis et al., in the method of Fosgate et al., in view of Griesinger, because this would provide higher quality surround sound that includes the psychoacoustic properties of an audio signal.

6. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fosgate et al., (WO 02/19768) in view of Griesinger (5,796,844) in view of

Dressler ("Dolby Pro Logic Surround Decoder Principles of Operation", Dolby Laboratories, August 29, 2000), as applied to claim 6, and further in view of Dressler ("Dolby Surround Pro Logic II Decoder Principles of Operation", Dolby Laboratories, 2000, hereinafter referred to as Dressler B).

As per claim 7, Fosgate et al., in view of Griesinger, and further in view Dressler discloses all the limitations of the method of claim 6. Fosgate et al, in view of Griesinger in view of Dressler, do not specifically teach the method of claim 6, wherein each said discrete point corresponds to a set of gain values predetermined to produce an optimized audio output at each of L, R, C, Ls, Rs speakers respectively, when the two-channel subband audio signals are steered to that point in the expanded sound field. Dressler B teaches controls that are used in any kind of decoder to allow optimization of the soundfield as desired including dimension control, center width control, and panorama mode (page 6, lines 9-25). Dressler B further describes an active decoder that keeps a dominant signal from leaking to surrounding speakers (page 4, lines 1-2), and the gains are adjusted to maintain balance of the dominant signals (page 4, lines 13-24). Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, to incorporate wherein each said discrete point corresponds to a set of gain values predetermined to produce an optimized audio output at each of L, R, C, Ls, Rs speakers respectively, when the two-channel subband audio signals are steered to that point in the expanded sound field as taught by Dressler B, in the method of

Fosgate et al, in view of Griesinger in view of Dressler, because this would produce the best quality audio signal at each of the surround sound speakers.

As per claim 8, Fosgate et al., in view of Griesinger, and further in view Dressler discloses all the limitations of the method of claim 7. Fosgate et al, in view of Griesinger on view of Dressler, do not specifically teach the method of claim 7, wherein each said discrete point further includes a gain value predetermined to produce an optimized audio output at a center surround (Cs) speaker when the subband audio signal is steered to that point in the expanded sound field. Dressler B teaches variable adjustment of the center image so it may be heard only from the center speaker (page 6, lines 17-18). Therefore it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate teaches variable adjustment of the center image so it may be heard only from the center speaker as taught by Dressler B in the method of Fosgate et al, in view of Griesinger in view of Dressler, because this would provide a optimized balanced sound when the subband audio signal is steered to the center surround speaker.

As per claim 9, Fosgate et al., in view of Griesinger do not specifically teach the method of claim 7, wherein steering the audio signals comprises computing a dominance vector being determined by the dominant audio signals in the subband, using said dominance vectors and said predetermined gain values for said discrete points to compute a set of gain values for each subband, and using said two-channel subband audio signals and said gain values to compute the multichannel

subband audio signals. Dressler teaches showing dominance vector quantity (page 8, lines 40-42, Fig.8), monitoring the encoded audio soundtrack to evaluate the inherent soundfield dominance (page 8, lines 53-54), and applying enhancement in the same direction and in proportion to that dominance (page 8, lines 54-55, Fig.10). The gain values are used in computing soundfield dominance.

Therefore it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the steering of the audio signals comprising computing a dominance vector being determined by the dominant audio signals in the subband, using said dominance vectors and said predetermined gain values for said discrete points to compute a set of gain values for each subband, and using said two-channel subband audio signals and said gain values to compute the multichannel subband audio signals as taught by Dressler in the method of Fosgate et al., in view of Griesinger, because, this would provide a optimized balanced sound from the surround-sound speakers.

7. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dressler ("Dolby Pro Logic Surround Decoder Principles of Operation", Dolby Laboratories, August 29, 2000 – hereinafter referred to as Dressler A) in view of Griesinger (5,796,844), and further in view of Dressler ("Dolby Surround Pro Logic II Decoder Principles of Operation", Dolby Laboratories, 2000 – hereinafter referred to as Dressler B).

As per claim 16, Dressler A in view of Griesinger teach the method as per claim 15. Dressler A in view of Griesinger, however, does not specifically teach the reconstructed multichannel audio comprising a plurality of dominant audio signals that reside in different subbands. Dressler B teaches sensing when a dominant sound occurs, and a decoder then provides enhancement on an instantaneous basis between two or more encoded positions when the signal are prominent enough to be heard as individual events (page 7, lines 48-51, 61-64). Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, to modify the method of decoding two-channel matrix encoded audio of Dressler A in view of Griesinger, wherein the reconstructed multichannel audio comprises a plurality of dominant audio signals for the purpose of enhancing the audio signal to provide a more realistic signal.

As per claim 18, Dressler A in view of Griesinger teach the method of claim 15. Dressler in view of Griesinger do not specifically teach wherein each said discrete point further includes a gain value predetermined to produce an optimized audio output at a center surround (Cs) speaker when the subband audio signal is steered to that point in the expanded sound field. Dressler B teaches variable adjustment of the center image so it may be heard only from the center speaker (page 6, lines 17-18). Therefore it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate teaches variable adjustment of the center image so it may be heard only from the center speaker as taught by

Dressler B in the method of Dressler A, in view of Griesinger, because this would provide a optimized balanced sound when the subband audio signal is steered to the center surround speaker.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dressler ("Dolby Pro Logic Surround Decoder Principles of Operation", Dolby Laboratories, August 29, 2000) in view of Griesinger (5,796,844), as applied to claim 15, and further in view of Davis et al., (5,247,740).

As per claim 17, Dressler in view of Griesinger teaches the method according to claim 15. However, Dressler in view of Griesinger do not specifically teach wherein the subband filtering groups the subband audio signals into a plurality of bark bands. Davis et al., teach subband coding to reduce the amount of information transmitted in a particular frequency band where the resulting coding noise is psychoacoustically masked by neighboring spectral components. Psychoacoustic masking effects usually may be more efficiently exploited if the bandwidth of the frequency band are chosen commensurate with the bandwidths of the human ear's "critical bands" (Col.4, lines 1-8). Bark bands are a type of critical band. Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate subband filtering of the subband audio signals into a plurality of bark bands as taught by Davis et al., in the method of Fosgate et al., in

view of Griesinger, because this would provide higher quality surround sound that includes the psychoacoustic properties of an audio signal.

9. Claims 15, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dressler ("Dolby Pro Logic Surround Decoder Principles of Operation", Dolby Laboratories, August 29, 2000) in view of Griesinger (5,796,844).

As per claim 15, Dressler teaches a method of decoding two-channel matrix encoded audio to reconstruct multichannel audio that approximates a discrete surround-sound presentation comprising:

providing two-channel matrix encoded audio that includes at least left, right, center, left surround and right surround (L, R, C, Ls, Rs) audio channels (page 2, lines 8-10, page 8, lines 47-48, Figs. 3 and 4);

subband filtering the two-channel matrix encoded audio into a plurality of two-channel subband audio signals (page 2, lines 8-10, page 8, lines 47-48, Figs. 3 and 4);

steering the two-channel subband audio signals in an expanded sound field to form multichannel subband audio signals, said sound field having a discrete point for each said audio channel, each said discrete point corresponding to a set of gain values predetermined to produce an optimized audio output at each of L, R, C, Ls, and Rs speakers respectively, when the two-channel subband audio signals are

steered to that point in the expanded sound field (page 2, lines 8-10, page 8, lines 47-48, Figs. 3 and 4); and'

synthesizing the multichannel subband audio signals in the subbands to reconstruct the multichannel audio (page 2, lines 8-10, page 8, lines 47-48, Figs. 3 and 4).

Dressler, however, does not specifically teach separately steering the two-channel audio signal. Griesinger does teach separately steering the two-channel subband audio signal in a sound field to form multichannel subband audio signals (Col.13, line 66 – Col.14, line 25). Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention, that by separately steering the audio signal as taught by Griesinger incorporated in the method of Dressler to design a decoding matrix by providing high left to right separation in all output channels, and this high separation is maintained regardless of the direction of the dominant encoded signal.

As per claim 19, Dressler discloses all the limitations of the method of claim 15, wherein the expanded sound field comprises a 9-point sound field. Dressler teaches a decoder that recovers the left, center, right signals for playback over three front speakers, and extracts the surround signal for distribution over an array speakers wrapped around the sides and back of the theatre (page 2, lines 8-10, Figs. 3 and 4). The number of speakers in the array may be nine in order to create a 9-point sound field. Dressler further teaches monitoring the encoded soundtrack

to evaluate the inherent soundfield dominance, and applying enhancement in the same direction and in proportion to that dominance (page 8, lines 53-57). The gain values are used in computing soundfield dominance.

Response to Arguments

10. Applicant's arguments with respect to claims 1-11, 15-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fosgate (5,307,415) teaches a surround processor with antiphase blending and panorama control circuitry.

Scheiber (4,704,728) teaches signal redistribution, decoding and processing in accordance with amplitude, phase, and other characteristics.

Griesinger (5,870,480) teaches multichannel active matrix encoder and decoder with maximum lateral separation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vijay B. Chawan whose telephone number is

(703) 305-3836. The examiner can normally be reached on Monday Through Thursday 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vijay B Chawan

Vijay B. Chawan
Primary Examiner
Art Unit 2654

vbc

VIJAY CHAWAN
PRIMARY EXAMINER